HP StorageWorks

Edge Switch 2/12 installation guide

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Edge Switch 2/12 installation guide

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About this guide

This guide provides information about:

- Installing the Edge Switch 2/12
- Performing an initial configuration of the switch

Intended audience

This guide is intended for use by administrators who are familiar with the following:

- Fibre Channel technology
- HP StorageWorks Fibre Channel switches

Related documentation

For a list of corresponding documentation included with this product, see the Related Documents section of the *HP StorageWorks Edge Switch Release Notes*.

For the latest information, documentation, and firmware releases, please visit the HP StorageWorks website:
http://h18006.www1.hp.com/storage/saninfrastructure.html

For information about Fibre Channel standards, visit the Fibre Channel Industry Association website:
http://www.fibrechannel.org

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	• Key names • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Text typed at the command-line
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command-line

WARNING! indicates that failure to follow directions could result in bodily harm or death.

CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT: Provides clarifying information or specific instructions.

NOTE: Provides additional information.

TIP: Provides helpful hints and shortcuts.

Rack stability

⚠ **WARNING!** To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, secure racks together.
- Extend only one rack component at a time. Racks may become unstable if more than one component is extended.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP web site: http://www.hp.com/support/.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign-up online using the Subscriber's choice web site at http://www.hp.com/go/e-updates.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing-up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-345-1518.
- Elsewhere, visit http://www.hp.com and click **Contact HP** to find locations and telephone numbers.

Helpful web sites

For third-party product information, see the following vendor web sites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/support/
- http://www.docs.hp.com

1 Switch features

The HP StorageWorks Edge Switch 2/12 provides up to 12 ports of low-cost and high-performance dynamic Fibre Channel connectivity for switched fabric devices or arbitrated loop devices. This function allows low-cost, low-bandwidth workgroup (edge) devices to communicate with mainframe servers, mass storage devices, or other peripherals, and ultimately to be incorporated into an enterprise storage area network (SAN) environment.

This chapter describes the Edge Switch 2/12 and switch management through the Embedded Web Server (EWS) interface. The chapter specifically describes:

Edge Switch 2/12 description

The Edge Switch 2/12 provides Fibre Channel connectivity through 12 ports that operate at either 1.0625 or 2.125 gigabits per second (Gbps). Switch ports can be configured as:

- Fabric ports (F_Port) to provide direct connectivity for up to 12 switched fabric devices.
- Fabric loop ports (FL_Port) to provide arbitrated loop connectivity and fabric attachment for FC-AL devices. Each FL_Port can theoretically support the connection of 126 FC-AL devices.
- Expansion ports (E_Port) to provide interswitch link (ISL) connectivity to fabric directors and switches. E_Port connectivity is not standard, and must be configured through an optional feature key.
- Generic mixed port (GX_Port) to configure a port as a generic loop port (GL_Port). This selection is available only if enabled through an optional feature key.
- Generic port (G_Port) to configure a port as a generic port. This selection is available only if enabled through an optional feature key.

The switch, shown in Figure 1 on page 12 provides dynamic switched connections for servers and devices, supports mainframe and open-systems interconnection (OSI) computing environments, and provides data transmission and flow control between device node ports (N_Ports) as dictated by the Fibre Channel Physical and Signaling Interface (FC-PH 4.3). Through interswitch links (ISLs), the switch can connect additional switches to form a Fibre Channel multi-switch fabric.

Administrators or operators with a browser-capable PC and an Ethernet connection monitor and manage the switch through the EWS interface. The EWS interface manages only a single switch, and provides a graphical user interface (GUI) that supports product configuration, statistics monitoring, and basic operation. The EWS interface is opened from a standard Web browser running Netscape Navigator 4.6 or later or Microsoft® Internet Explorer 4.0 or later.

The switch provides connectivity for devices manufactured by multiple original equipment manufacturers (OEMs). To determine if an OEM product can communicate through connections provided by the switch, or if communication restrictions apply, refer to the supporting publications for the product or contact your HP marketing representative.

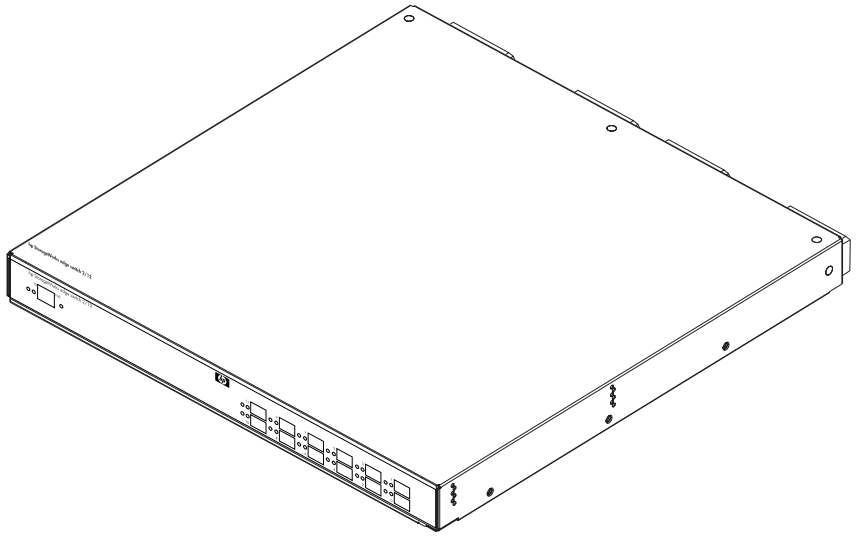


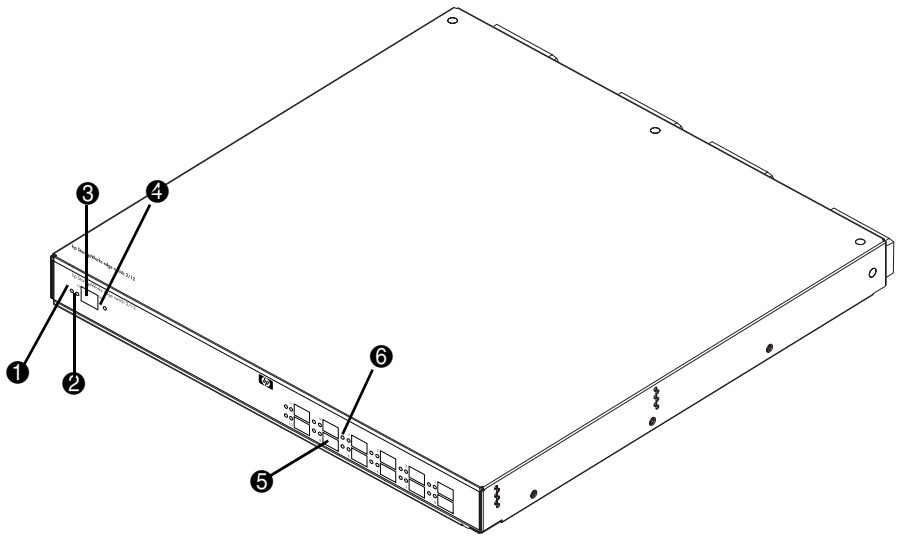
Figure 1 Edge Switch 2/12 (front view)

Field replaceable units (FRUs)

The switch provides a modular design that enables quick removal and replacement of FRUs, small form factor pluggable (SFP) optical transceivers. Edge Switch 2/12 FRUs are detailed in the front panel feature descriptions.

Front panel features

Figure 2 shows the front panel controls, connectors, and indicators.



1 PWR LED (green)
2 ERR LED (amber)
3 Ethernet LAN connector 10/100
4 IML/RESET
5 SFP fiber optic connectors
6 Port LEDs

Figure 2 Edge Switch 2/12 front panel features

Power and system error LEDs

The PWR LED, as shown in Figure 2, illuminates when the switch is connected to facility AC power and powered on. If the LED extinguishes, a facility power source, power cord, or power distribution failure is indicated.

The ERR LED, as shown in Figure 2, illuminates when the switch detects an event requiring immediate operator attention, such as a FRU failure. The LED remains illuminated as long as an event is active. The LED extinguishes when the Clear System Error Light function is selected from the Element Manager.

The ERR LED blinks if unit beaconing is enabled. An illuminated LED (indicating a failure) takes precedence over unit beaconing. The LED also blinks (at twice the beaconing rate) when the IML/RESET button is pressed and held for more than three seconds.

Ethernet LAN connector

The front panel provides a 10/100 megabit per second (Mbps) RJ-45 twisted-pair connector that attaches to an Ethernet LAN to provide communication with the EWS interface or an SNMP management workstation. Two green LEDs are associated with the LAN connector. When illuminated, the left LED indicates LAN operation at 10 Mbps, and the right LED indicates LAN operation at 100 Mbps.

Initial machine load/reset button

The **IML/RESET** button is shown in Figure 2 on page 13. When the **IML/RESET** button is pressed, held for three seconds, and released, the switch performs an initial machine load that reloads the firmware from FLASH memory. This operation is not disruptive to Fibre Channel traffic. If the button is held for more than three seconds, the ERR LED blinks at twice the unit beaconing rate.

When the **IML/RESET** button is pressed and held for ten seconds, the switch performs a reset. After three seconds, the ERR LED blinks at twice the unit beaconing rate. A reset is disruptive and resets the following:

- Microprocessor and functional logic for the control processor (CTP) card and reloads the firmware from FLASH memory.
- Ethernet LAN interface, causing the connection to the EWS interface to drop momentarily until the connection automatically recovers.
- Ports, causing all Fibre Channel connections to drop momentarily until the connections automatically recover. This causes attached devices to log out and then log back in; therefore data frames lost during switch reset must be retransmitted.

A reset should be performed only if a CTP card failure is indicated. As a precaution, the **IML/RESET** button is flush mounted to protect against inadvertent activation.

SFP transceivers (fibre optic connectors)

The Edge Switch 2/12 provides 12 Fibre Channel ports. A single-mode or multi-mode fiber-optic cable attaches to a port through a small form factor pluggable (SFP) transceiver. The SFP provides a duplex LC interface, and can be detached from the switch port for easy replacement. The following fiber-optic transceiver types are available:

- Shortwave laser—Shortwave laser SFPs provide short-distance connections (2 to 500 meters) through 50-micron or 62.5-micron multi-mode fiber.
- Longwave laser—Longwave laser SFPs provide long-distance connections (up to 10 kilometers) through 9-micron single-mode fiber.
- E_Port (Full-Fabric) feature key is required to use the longwave laser.

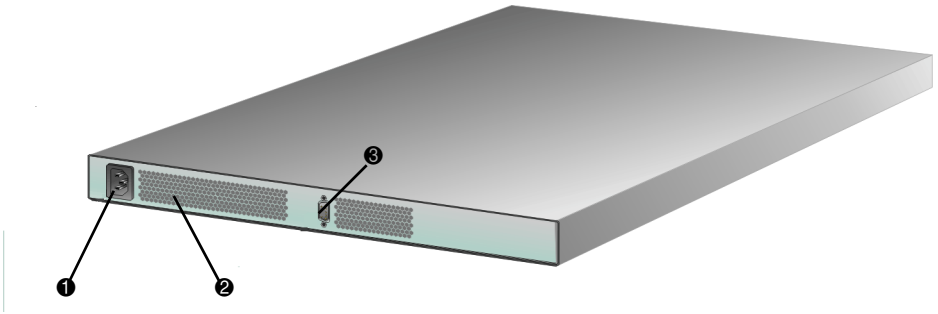
Port LEDs

Amber and green/blue LEDs to the left of each Fibre Channel port illuminate, extinguish, or blink to indicate port status and port speed.

- Amber LED—Illuminates if the port fails.
- Green/blue LED—Illuminates green to indicate 1.0625 Gbps port operation. Illuminates blue to indicate 2.125 Gbps port operation.

Rear panel features

The switch provides a power supply with internal cooling fans. Figure 3 illustrates the rear of the switch.



1 AC power receptacle
2 Power supply with internal cooling fans
3 Maintenance port

Figure 3 Edge Switch 2/12 (rear view)

Power supply

The switch contains one power supply with internal cooling fans. The power supply steps down and rectifies facility input power to provide 3.3 volts direct current (VDC), 5 VDC, and 12 VDC to the control processor (CTP) card. The power supply also provides input filtering, overvoltage protection, and overcurrent protection.

Three cooling fans (two integrated in the power supply) provide cooling for the power supply and CTP card, as well as redundancy for continued operation if a single fan fails.

Power supply requirements are listed in "Technical specifications" on page 61.

Maintenance port

The rear panel provides a 9-pin D Subminiature connector (DSUB) maintenance port, as shown in Figure 3 on page 15, that provides a connection for a local terminal or dial-in connection for a remote terminal. Although the port is typically used by authorized maintenance personnel, operations personnel can use the port to configure switch network addresses.

Switch management

The switch is managed and controlled through a customer-supplied PC platform with an Ethernet connection to the EWS interface on the switch. Using this graphical user interface (GUI), operators can quickly view switch status. The interface also allows service personnel to perform configuration tasks; view system alerts and related log information; and monitor switch status, port status, and performance. FRU status and system alert information are highly visible.

Embedded Web Server (EWS)

Administrators or operators with a browser-capable PC and an Ethernet connection monitor and manage the switch through the EWS interface. The EWS interface manages only a single switch, and provides a graphical user interface (GUI) that supports product configuration, statistics monitoring, and basic operation. The EWS interface is opened from a standard web browser running Netscape Navigator 4.6 or later or Microsoft Internet Explorer 4.0 or later.

At the browser, enter the Internet Protocol (IP) address of the switch as the Internet uniform resource locator (URL). When prompted at a login screen, enter a user name and password.

Refer to the *HP StorageWorks Embedded Web Server user guide* for more information.

Command line interface

The command line interface (CLI) allows you to access many switch management functions while entering commands during a Telnet session with the switch. The primary purpose of the CLI is to automate management of a large number of switches using scripts. The CLI is not an interactive interface; no checking is done for pre-existing conditions and no prompts display to guide users through tasks.

Refer to *HP StorageWorks CLI reference guide for directors and edge switches* for more information.

Operational features

The Edge Switch 2/12 supports several operational features including:

- Advanced error detection, reporting, and serviceability
- Zoning
- Support for multi-switch fabrics
- Software diagnostics to aid in fault isolation and repair

Error-detection, reporting, and serviceability features

The switch provides the following error detection, reporting, and serviceability features:

- Light-emitting diodes (LEDs) on switch FRUs and adjacent to Fibre Channel ports that provide visual indicators of hardware status or malfunctions.
- FRUs (SFP transceivers) that are removed or replaced without disrupting switch or Fibre Channel link operation.
- A modular design that enables quick removal and replacement of FRUs without the use of tools or equipment.
- System alerts and logs that display switch, Ethernet link, and Fibre Channel link status at the EWS interface.
- Diagnostic software that performs power-on self-tests (POSTs) and port diagnostics (loopback tests).

- An RS-232 maintenance port at the rear of the switch (port access is password-protected) that enables installation or service personnel to change the switch's IP address, subnet mask, and gateway address.

  These switch parameters can also be changed through a Telnet session, access for which is provided through a local or remote PC with an Ethernet connection to the switch.
- Data collection through the EWS interface application to help isolate system problems. The data includes a memory dump file and audit, hardware, and engineering logs.
- Beaconing to assist service personnel in locating a specific port or switch. When port beaconing is enabled, the amber LED associated with the port flashes. When unit beaconing is enabled, the system error indicator on the front panel flashes. Beaconing does not affect port or switch operation.
- SNMP management using the Fibre Channel Fabric Element MIB (Version 3.1), Transmission Control Protocol/Internet Protocol (TCP/IP) MIB-II definition (RFC 1213), or a product-specific MIB that runs on the switch. Up to six authorized management workstations for Edge switches and directors, and up to 12 on the HAFM appliance can be configured through the EWS interface and Element Manager to receive unsolicited SNMP trap messages. The trap messages indicate product operational state changes and failure conditions.

NOTE: For more information about SNMP support provided by Hewlett-Packard products, refer to the *HP StorageWorks SNMP reference guide for directors and edge switches*.

Zoning

The switch supports a hardware-enforced name server zoning feature that partitions attached devices into restricted-access groups called zones. Devices in the same zone can recognize and communicate with each other through switched port-to-port connections. Devices in separate zones cannot communicate with each other.

NOTE: Zoning is disabled by default. You must enable zoning in order to see the attached nodes.

Zoning is configured by authorizing or restricting access to name server information associated with device N_Ports that attach to switch fabric ports (F_Ports). A zone member is specified by the port number to which a device is attached, or by the eight-byte (16-digit) World Wide Name (WWN) assigned to the host bus adapter (HBA) or Fibre Channel interface installed in a device. A device can belong to multiple zones.

△ **CAUTION:** If zoning is implemented by port number, a change to the switch fiber-optic cable configuration disrupts zone operation and may incorrectly include or exclude a device from a zone.

If zoning is implemented by WWN, removal and replacement of a device HBA or Fibre Channel interface (thereby changing the device WWN) disrupts zone operation and may incorrectly include or exclude a device from a zone.

In Open Fabric mode, only zoning by WWN is supported. Zoning by port numbers is not.

Zones are grouped into zone sets. A zone set is a group of zones that is enabled (activated) or disabled across all switches in a multi-switch fabric. Only one zone set can be enabled at one time.

Multi-switch fabrics

A Fibre Channel topology that consists of one or more interconnected switches or switch elements is called a fabric. Optional E_Port (Full-Fabric) feature key provides the ability to interconnect switches (through E_Port connections) to form a multi-switch fabric. The data transmission path through the fabric is typically determined by fabric elements and is user-transparent. Subject to zoning restrictions, devices attached to any interconnected switch can communicate with each other through the fabric.

Software diagnostics

The switch provides the following diagnostic software features that aid in fault isolation and repair of problems:

- SFP transceivers provide on-board diagnostic and monitoring circuits that continuously report status to the EWS interface. The interface provides system alerts and logs that display failure and diagnostic information.
- The EWS interface that provides Ethernet access to isolate problems for a single switch.
- Unsolicited SNMP trap messages that indicate operational state changes or failures and can be transmitted to up to six authorized management workstations.

Optional kits

Contact your Hewlett-Packard authorized service provider to purchase optional Edge Switch 2/12 kits. Table 2 describes the Edge Switch 2/12 kits.

Table 2 Edge Switch 2/12 optional kits

Supporting Kit	Description
4-flexport upgrade for Edge Switch 2/12 Part Number: 348407-B21	Used to upgrade the Edge Switch 2/12 from: 4 to 8 ports 8 to 12 ports
E-Port (Full-Fabric) License for Edge Switch 2/12 Part Number: 348408-B21	Used to purchase E-Port licenses for Edge Switch 2/12 Ports.
300 m Optical Transceiver Kit Part Number: 300834-B21	Provides short-wave optical transceiver for the Edge Switch 2/12.
10 km Long-Distance Optical Transceiver Kit Part Number: 300835-B21	Provides 10 km long-wave optical transceiver for the Edge Switch 2/12.

NOTE: E_Port (Full-Fabric) feature key is required to use the 10 km long-distance optical transceiver.

2 Installing and configuring the Edge Switch 2/12

This chapter describes tasks to install, configure, and verify operation of the Edge Switch 2/12. This chapter includes the following topics:

Installation options

The Edge Switch is installed in one of two configurations:

- Table or desktop—One or more edge switches may be installed on a desk or tabletop. Ethernet cabling, distance, and local area network (LAN) addressing issues must be considered.
- Customer-supplied equipment rack—One or more edge switches may be installed in a customer-supplied equipment rack. Rack-mount hardware is provided in the shipping container. Ethernet cabling, distance, and LAN addressing issues must be considered.

Review installation requirements

Verify that the following requirements are met prior to Edge Switch and EWS interface installation:

- A site plan is prepared, configuration planning tasks are complete, planning considerations are evaluated, and related planning checklists are complete, fabric and device connectivity are evaluated, and the related planning worksheet is complete. Refer to the *HP StorageWorks SAN design reference guide* at: http://h18006.www1.hp.com/products/storageworks/san/documentation.html.
- A browser-capable PC and Ethernet connectivity are available to support Edge Switch management through the EWS interface.
- Support equipment and personnel are available for the installation.
- The required number and type of fiber-optic jumper cables are delivered and available. Ensure the cables are the correct length with the required connectors.
- A customer-supplied equipment rack and associated hardware are available (optional).
- Remote workstations or SNMP workstations are available (optional). Workstations are customer-supplied and connected through a corporate or dedicated LAN.

Unpack and inspect the switch

This section provides instructions for unpacking and inspecting the Edge Switch 2/12 prior to installing it in a desktop or rack-mount configuration.

To unpack and inspect the switch:

△ **CAUTION:** When you remove the Edge Switch from the carton, do not rest it on its rear window while examining it. To do so may break the FRU handles.

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1. Inspect the shipping containers for damage caused during transit. If a container is damaged, ensure a representative from the freight carrier is present when the container is opened.
2. Unpack the shipping containers and inspect each item for damage. Save all shipping and packing materials. Ensure that all items on the enclosed shipping list are in each container.
3. If any items are damaged or missing, contact an HP-authorized service provider or reseller.

Install the Edge Switch on a desktop

To install and configure the Edge Switch on a desktop:

1. Remove the backing from the three adhesive rubber pads and apply the pads to the underside of the Edge Switch. Ensure the pads are aligned with the scribed circles at each corner and in the middle of the Edge Switch.
2. Position the Edge Switch on a table or desktop. Ensure that:
   - Grounded AC electrical outlets are available.
   - Adequate ventilation is present.
   - Areas with excessive heat, dust, or moisture are avoided.
   - All planning considerations are met. Refer to the *HP StorageWorks HA-Fabric Manager user guide*.
3. Verify all field-replaceable units (FRUs), small form factor pluggable (SFP) optical transceivers, are installed as ordered.
4. Connect the U.S.- or country-specific (optional) AC power cord receptacle at the rear of the chassis.

⚠ **WARNING!** An HP-supplied power cord is provided for the Edge Switch power supply. To prevent electric shock when connecting the Edge Switch to primary facility power, use only the supplied power cord and ensure that the facility power receptacle is the correct type, supplies the required voltage, and is properly grounded.

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5. Connect the AC power cord to a facility power source that provides single-phase, 100 to 240 volt alternating current (VAC).

   When the power cord is connected, the Edge Switch powers on and performs power-on self-test (POST). During POST:

   - The green power (PWR) LED on the front panel illuminates.
   - The amber system error (ERR) LED on the front panel blinks momentarily while the Edge Switch is tested.
   - The green LEDs associated with the Ethernet port blink momentarily while the port is tested.
   - The green/blue and amber LEDs associated with Fibre Channel ports blink momentarily while the ports are tested.

6. After successful POST completion, the green power (PWR) LED remains ON and all other front panel LEDs turn OFF.
7. If a POST error or other malfunction occurs, refer to the *HP StorageWorks Edge Switch 2/12 service manual* to isolate the problem.

Install the Edge Switch in a rack

This section describes how to mount the HP StorageWorks Edge Switch 2/12 in a standard HP rack.

Rack mount checklist

This section describes the contents of the rack mount kit as well as tools or equipment required to complete the installation.

NOTE: The hardware kit includes parts not required for the configuration described in these instructions.

Mounting hardware

- Four (4) two-hole bar nuts
- Six (6) three-hole bar nuts (only 4 used)
- Eight (8) square alignment washers (required only for HP 9000, 10000, and 11000 series racks)
- Eight (8) Phillips panhead screws (10-32 x 1/2) with split lock and flat washers
- Eight (8) Phillips flathead screws (8-32 x 7/16)
- Ten (10) Phillips panhead screws (10-32 x 5/8) with flat washer (only 2 used)
- Six (6) Phillips flathead screws (6-32 x 3/8) (not used)
- Twelve (12) Phillips panhead screws (10-32 x 3/8) (not used)
- Four (4) 8-32 Keps nuts (not used)

Brackets and rails

Brackets and rails included in the kit are shown in Figure 4 on page 24:

❶ Two (2) fixed-length slide rails (one left and one right)

❷ Two (2) Front brackets

❸ Two (2) Rear brackets (long)

❹ Two (2) Rear spacing bracket

❺ Rear bracket (short)–not used in this configuration

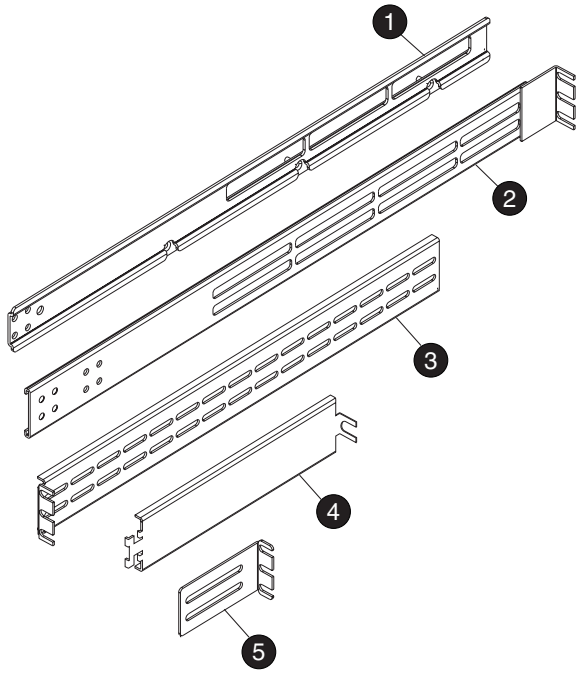


Figure 4 Brackets included in kit

Required tools

The following tools are required:

- Torx driver with a T10 Torx bit
- #2 Phillips screwdriver (not included in the kit)

Rack mount procedure

Follow this procedure to rack mount the HP StorageWorks Edge Switch 2/12 in the appropriate HP, or comparable, 19-inch Electronic Industries Association (EIA) rack:

- HP 9000 series, 10000 series, or 11000 series racks
- HP system/e or 19-inch EIA rack

Mounting the adjustable brackets in the rack

Use these steps to install the adjustable brackets in the rack. You will need a #2 Phillips screwdriver and eight 10x32 panhead screws to complete this procedure.

NOTE: f you are installing the Edge Switch 2/12 in an HP 9000, 10000, or 11000 series rack, you will need eight square alignment washers to complete this procedure.

1. Determine the position of the switch in the rack. Each Edge Switch 2/12 is 1.75 inches or 1U high.
2. Attach four bar nuts (three-hole bar nuts) to the cabinet frame using eight Phillips panhead screws (10-32 x 1/2) with split lock and flat washers.

   NOTE: Do not install a screw in the center hole of each bar nut.

   a. If you are installing the Edge Switch 2/12 in an HP 9000, 10000, or 11000 series rack, place a square alignment washer on each panhead screw before inserting in the square cabinet frame holes.
   b. Mount the bar nut on the inside of the cabinet frame. Orient the holes in the bar nut so that they are aligned closest to the inside edge of the cabinet frame.
   c. Secure, but do not completely tighten all screws.
3. Measure cabinet depth from inside edge to inside edge of the cabinet frame.
4. Assemble two sets of front and rear brackets so that the combined brackets are equal to the depth of the cabinet.
5. Attach a two-hole bar nut using four Phillips flathead screws (8-32 x 7/16) to hold each assembled bracket together. Do not completely tighten but tighten enough to hold the brackets together.
6. Install the assembled brackets in the cabinet by sliding the mounting brackets between the bar nut and cabinet frame.
7. Tighten the three-hole bar nut screws on the mounting brackets so that the rails are stable, but can be easily adjusted.
8. Securely tighten the two-hole bar nut screws holding the front and rear brackets together.

   NOTE: If you are installing the Edge Switch in an HP rack system/e, complete step 9.

9. Attach another two-hole bar nut at the rear of the last vent slot using four Phillips flathead screws (8-32 x 7/16) to stabilize the inside ends of the rear brackets.

Mounting the slide rails on the sides of the switch

Use these steps to install the slide rails on the sides of the switch as shown in Figure 5 on page 26. You will need a Torx driver with a T10 Torx bit (supplied in the kit) and left and right slide rails to complete this procedure.

1. On the Edge Switch 2/12, remove the six screws (three screws per side) that help hold the switch cover in place.

   NOTE: Do not discard these screws, as you will use them to attach the slide rails.

2. Using the Torx driver and the screws you removed earlier, attach the left and right slide rails to the Edge Switch 2/12.

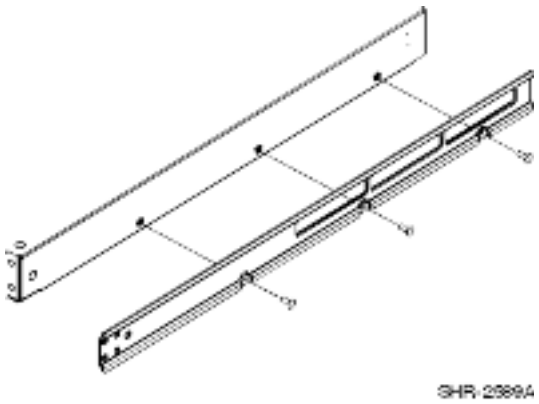


Figure 5 Attaching the slide rail to the switch

Installing the switch in the cabinet

Use these steps to install the switch in the cabinet. You will need a #2 Phillips screwdriver and two rear spacing brackets to complete this procedure.

1. From the front side of the cabinet, slide the switch into the mounting brackets and along the rails until the rear of the switch is flush with the rear of the cabinet.
2. Bring the rear spacing brackets to the rear of the cabinet.
3. Pull the switch toward the rear of the cabinet until it protrudes approximately 3 inches.
4. Orient the rear spacing bracket mounts so that they are pointed outward. Insert the tabs on each rear spacing bracket into the designated slots in each rail.
5. Push the switch forward using both rear spacing brackets until the rear spacing bracket mounts contact the cabinet rail.
6. Attach the rear spacing brackets to the cabinet using two Phillips panhead screws (10-32 x 5/8) with flat washer.
7. Ensuring that the square alignment washers are seated properly within the square cabinet frame holes, use a Phillips screwdriver to tighten the rear and front mounting screws.

Configure switch network information

The Edge Switch 2/12 is delivered with the following default network addresses:

- MAC address—The media access control (MAC) address is programmed into FLASH memory on the CTP card at the time of manufacture. The MAC address is unique for each Edge Switch, and should not be changed. The address is in xx.xx.xx.xx.xx.xx format, where *xx* is a hexadecimal pair.
- IP address—The default (factory preset) internet protocol (IP) address is 10.1.1.10.

  If multiple Edge Switches are installed on the same LAN, each Edge Switch must have a unique IP address. One Edge Switch can use the factory-set address, but the addresses of the remaining Edge Switches must be changed.
- Subnet mask—The default subnet mask is 255.0.0.0. If the switch is installed on a complex public LAN with one or more routers, the address may require change.
- Gateway address—The default gateway address is 0.0.0.0. If the switch is installed on a dedicated LAN with no connection through a router, the address does not require change. If the switch is installed on a public LAN (corporate intranet), the gateway address must be changed to the address of the corporate intranet's local router.

Verify the type of LAN installation with the network administrator. If one switch is installed on a dedicated LAN, network addresses do not require change.

Changing the switch address

If multiple switches are installed or a public LAN segment is used, network addresses must be changed to conform to the LAN addressing scheme. The following items are required to perform this task.

- A local workstation (desktop or notebook computer) with the following:
  - Microsoft Windows® 2000, Windows Server 2003, Windows XP®, Windows 98, or Windows NT® 4.0 operating system.
  - RS-232 serial communication software (for example, ProComm Plus or HyperTerminal). HyperTerminal is provided with the Windows operating systems.
- An asynchronous RS-232 null modem cable (provided with the switch).

Perform the following steps to change a switch's IP address, subnet mask, or gateway address:

1. Remove the protective cover from the 9-pin maintenance port at the rear of the switch (#2 Phillips screwdriver is required). Connect the 9-pin end of the RS-232 null modem cable to the port.
2. Connect the other cable end to a 9-pin communication port (COM1 or COM2) at the rear of the maintenance terminal PC.
3. Power on the maintenance terminal. After the PC powers on, the Windows desktop appears. Refer to operating instructions shipped with the PC.

NOTE: Procedures for changing network addresses using the HyperTerminal serial communication software are described in step 4 through step 13.

4. Select **Start** > **Programs** > **Accessories** > **Communications** > **HyperTerminal**. The New Connection dialog box is displayed (Figure 6).

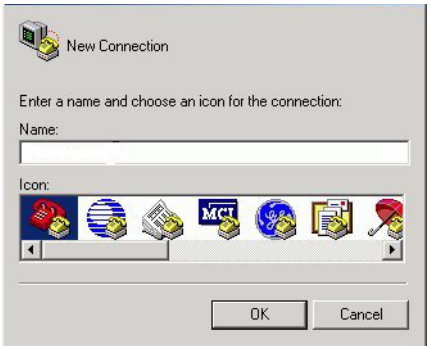


Figure 6 New Connection dialog box

5. Enter **edge switch 2-12** in the Name field and click **OK**. The Device dialog box is displayed (Figure 7).

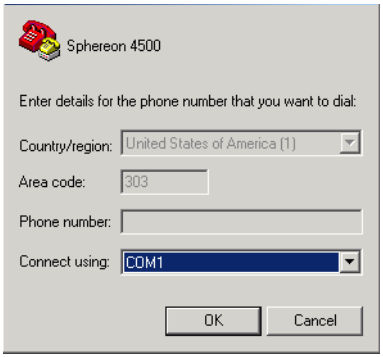


Figure 7 Device dialog box

6. Ensure the Connect using field displays `COM1` or `COM2` (depending on the serial communication port connection to the switch), and click **OK**. The Port Settings dialog box is displayed (Figure 8).

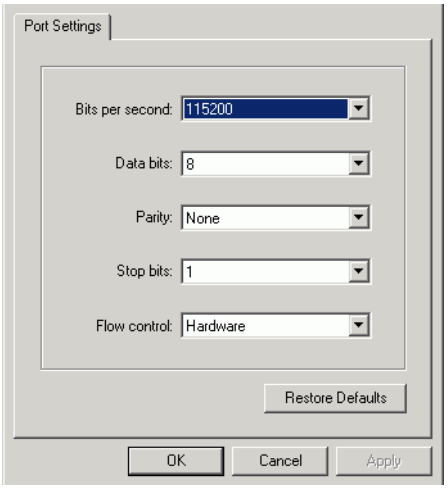


Figure 8 Port Settings dialog box

7. Enter the Port Settings parameters as follows:
   - Bits per second: **115200**
   - Data bits: **8**
   - Parity: **None**
   - Stop bits: **1**
   - Flow control: **Hardware** or **None**

   When the parameters are set, click **OK**. The HyperTerminal window appears.
8. At the > prompt, enter the user-level password (the default is *password*). The password is case sensitive. The HyperTerminal window appears.

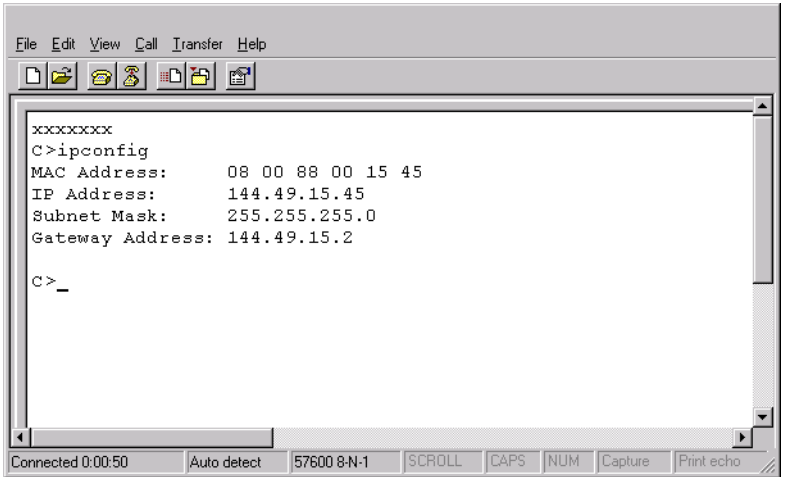


Figure 9 HyperTerminal window

9. At the `C>` prompt, enter `ipconfig`. The HyperTerminal window appears (Figure 9). The configuration information is listed below:
   - MAC Address
   - IP Address (default (factory preset) is 10.1.1.10)
   - Subnet Mask (default is 255.0.0.0).
   - Gateway Address (default is 0.0.0.0)

   Only the IP Address, Subnet Mask, and Gateway Address fields are configurable.
10. If necessary, change the IP address, subnet mask, and gateway address as directed by the network administrator. To change switch network addresses, enter the following at the `C>` prompt:

    ```
    ipconfig xxx.xxx.xxx.xxx yyy.yyy.yyy.yyy zzz.zzz.zzz.zzz
    ```

    The IP address is always `xxx.xxx.xxx.xxx`, the subnet mask is always `yyy.yyy.yyy.yyy`, and the gateway address is always `zzz.zzz.zzz.zzz`. The octets `xxx`, `yyy`, and `zzz` are decimals from zero through 255. If the IP address will not change from the one that was set when you opened the session, then there is no need to reenter it here.

    When the new network addresses are configured at the switch, the message `Request completed OK` is displayed at the bottom of the Edge Switch 2/12 — HyperTerminal window.
11. Select **File** > **Exit** to close the HyperTerminal application. A message box is displayed (Figure 10).

Figure 10 Disconnect Now dialog box

12. Click **Yes**. A message box is displayed (Figure 11).

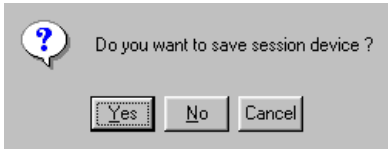


Figure 11 Save Session dialog box

13. Click **No** to exit and close the HyperTerminal application.
14. Power off the maintenance terminal:
    a. Select **Start** > **Shut Down**. The Shut Down Windows dialog box is displayed.
    b. At the Shut Down Windows dialog box, select **Shut down the Computer** and click **Yes** to power off the PC.
15. Disconnect the RS-232 null modem cable from the switch and the maintenance terminal. Replace the protective cover on the maintenance port.

LAN-Connect the switch

Connect the switch to the customer-supplied Ethernet LAN segment or the Ethernet hub.

To connect the desktop or rack-mounted switch to the Ethernet LAN segment:

1. Connect one end of the Ethernet patch cable (supplied with the switch) to the RJ-45 connector (labeled 10/100) on the left front of the chassis.
2. Connect the remaining end of the Ethernet cable to the LAN as follows:
   - If the switch is installed on a customer-supplied LAN segment, connect the cable to the LAN as directed by the network administrator.
   - If the switch is installed on an Ethernet hub, connect the cable to any available port on the hub.
3. To manage the switch through the EWS interface, attach the Ethernet LAN segment to an web browser-capable computer and go to "Using the Embedded Web Server" on page 31.

Using the Embedded Web Server

Use the EWS interface to configure the Edge Switch 2/12. Selectively perform the following configuration tasks according to your installation requirements:

- Configure switch ports.
- Configure the switch identification, date and time, switch and fabric parameters, and network addresses.
- Configure SNMP trap message recipients and enable the command line interface (CLI).
- Configure user rights and passwords.
- Install switch feature keys.

NOTE: This section describes the initial setup of the Edge Switch 2/12 using the EWS interface. For additional information on configuring more advanced features using EWS, see the online EWS help or the *HP StorageWorks Embedded Web Server user guide.*

Accessing the Embedded Web Server

A PC platform with Ethernet access and a standard web browser running Netscape Navigator 4.6 or later or Microsoft Internet Explorer 4.0 or later is required.

To open the EWS interface:

1. Ensure the browser-capable PC and the Ethernet LAN segment (with the switch attached) are connected.
2. At the PC, launch the browser application (Netscape Navigator or Internet Explorer).

3. At the browser, enter the IP address of the switch as the Internet uniform resource locator (URL). Use the default (factory preset) IP address of 10.1.1.10 or the IP address configured while performing "Configure switch network information" on page 27. The Enter Network Password dialog box is displayed (Figure 12).

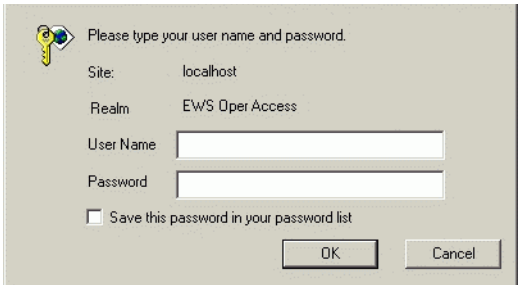


Figure 12 Enter Network Password dialog box

4. Enter the user name and password.

NOTE: The default user name is *Administrator* and the default password is *password*. The user name and password are case-sensitive.

5. Click **OK**. The EWS interface opens with the View window displayed (Figure 13).

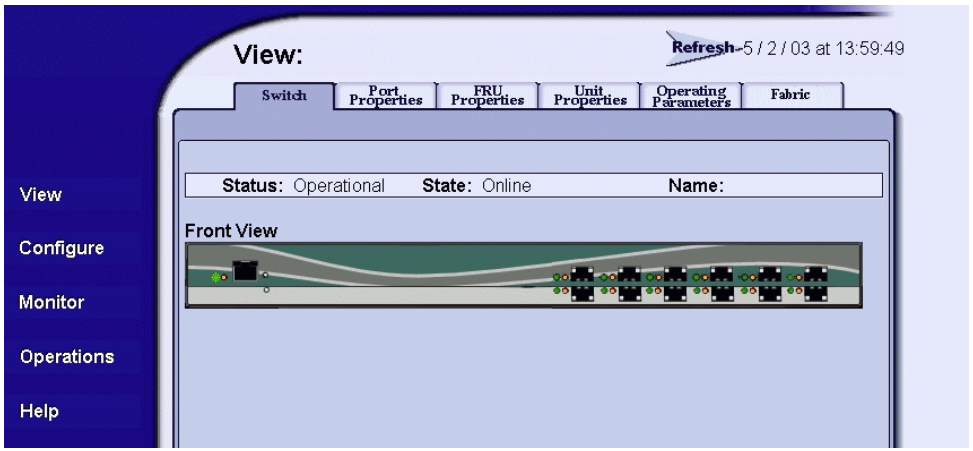


Figure 13 Embedded Web Server interface—View window

Configure switch ports

Perform the procedure in this section to configure names and operating characteristics for the switch ports.

To configure one or more ports:

1. Click **Configure** at the left side of the window. The Configure window opens with the Ports tab displayed (Figure 14).
   a. For each port to be configured, type a port name of 24 alphanumeric characters or less in the associated Name field. The port name should identify the device to which the port is attached.
   b. Click the check box in the **Blocked** column to block or unblock a port (default is unblocked). A check mark in the box indicates the port is blocked. Blocking a port prevents the attached device from communicating with the switch. A blocked port continuously transmits the offline sequence (OLS).

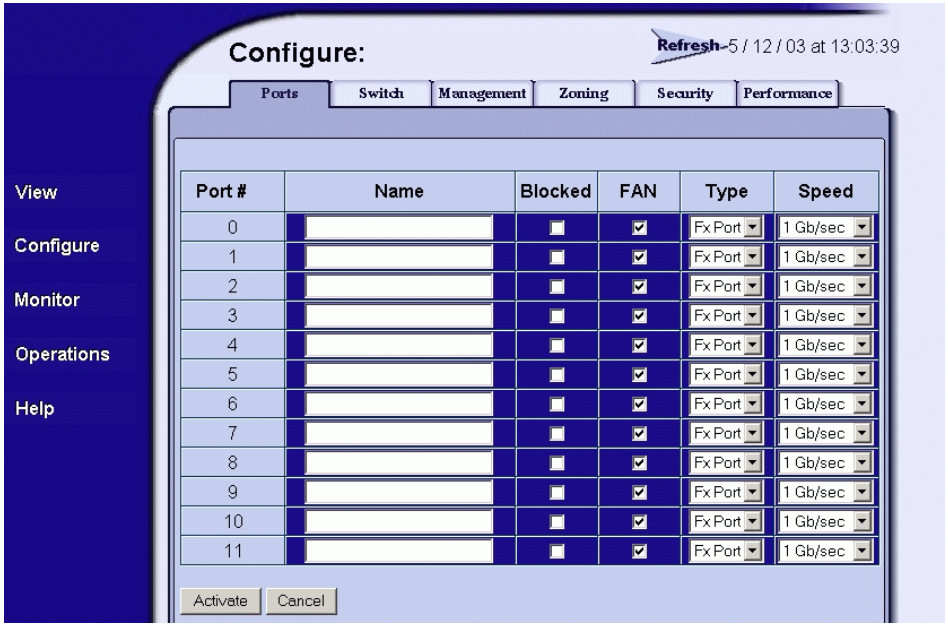


Figure 14 Block or unblock a port from the Configure window

   c. Click the check box in the **FAN** column to enable or disable the fabric address notification (FAN) feature (default is enabled). A check mark in the box indicates FAN is enabled. When the feature is enabled, the port transmits FAN frames after loop initialization to verify that FC-AL devices are still logged in. HP recommends this option be enabled for ports configured for loop operation.

d. Select the port type from the Type drop-down list. Available selections are:
   - Generic port (**G_Port**)—This selection is available only if enabled through an optional feature key.
   - Fabric port (**F_Port**).
   - Expansion port (**E_Port**)—This selection is available only if enabled through an optional feature key.
   - Generic mixed port (**GX_Port**)—Use this selection to configure a port as a generic loop port (GL_Port). This selection is available only if enabled through an optional feature key.
   - Fabric mixed port (**FX_Port**)—Use this selection to configure a port as a fabric loop port (FL_Port).

e. Select the port speed from the Speed drop-down list. Available selections are:
   - **Negotiate**—Auto-negotiate between 1.0625 and 2.125 gigabit per second (Gb/s) operation. This is the default selection.
   - **1 Gb/sec**—1.0625 Gb/s operation.
   - **2 Gb/sec**—2.125 Gb/s operation.

2. Click **Activate** to save the information. The message `Your changes to the Port configuration have been successfully activated` is displayed.

Configure BB credit

Perform this procedure to configure the BB Credit allocation for all ports on the product. For each type of port, there is a maximum and minimum BB Credit limit, which is displayed as a range. To configure the BB Credit allocation, the port must be set to offline. The simplest way to set the port to offline is to block the port (see "Configure switch ports" on page 33). As you enter the BB Credit value, the value will be validated and an error message will be displayed for each port if applicable. The BB Credit configuration will not be activated if there are any outstanding errors.

To configure BB credits:

1. Set the port offline.
2. At the View panel, select **Configure** > **Ports** > **BB Credits**. The **BB Credits** tab is displayed (Figure 15).

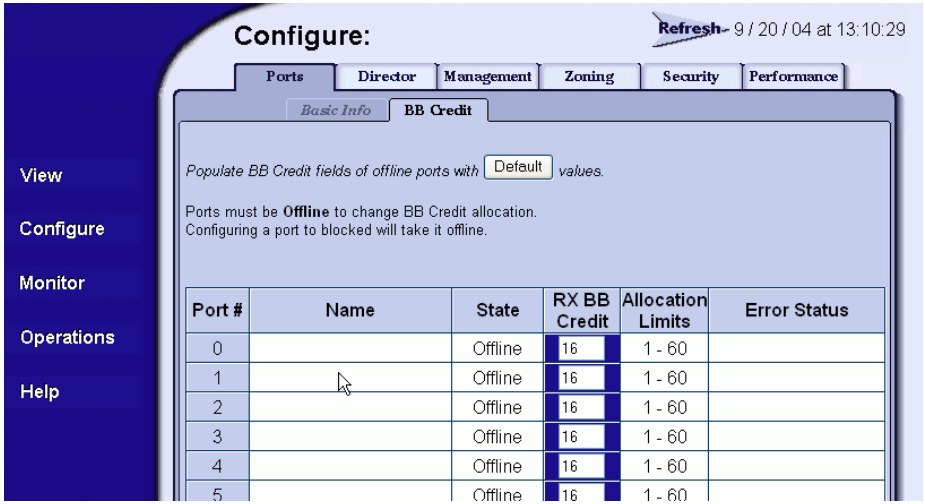


Figure 15 Ports page— BB Credit tab

TIP: Use the Windows vertical scroll bar to display additional port information rows.

3. Click **Default** to select the default values.

NOTE: HP recommends you use the default values. If they are not appropriate, you can enter values in the RX BB Credit field.

4. Click **Activate** to save the changes.
5. Place the port back online.

Configure switch identification

Perform this procedure to configure the switch name, description, location, and contact person. The `Name`, `Location`, and `Contact` variables configured here correspond respectively to the SNMP variables `sysName`, `sysLocation`, and `sysContact`. These variables are used by SNMP management workstations when obtaining data from managed switches.

To configure the switch identification:

1. Select **Configure** > **Switch**. The Switch page is displayed with the Identification tab selected (Figure 16).

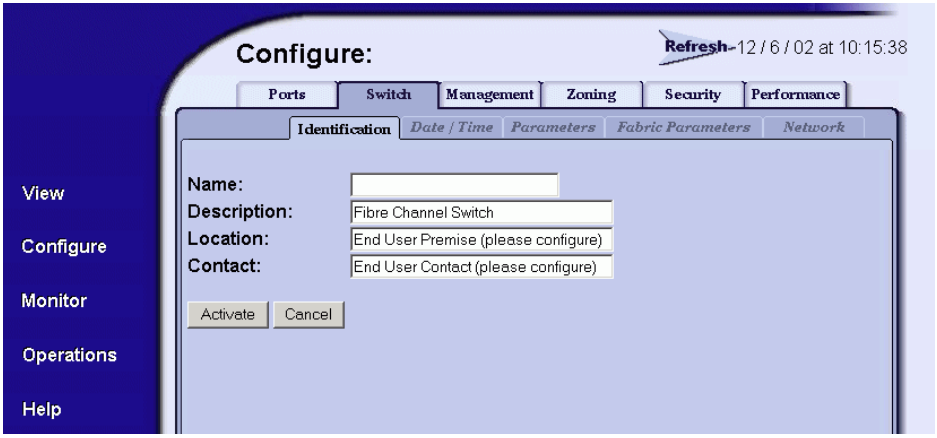


Figure 16 Switch page—Identification tab

   a. Enter a switch name of 24 or fewer alphanumeric characters in the Name field. Each switch should be configured with a unique name.

      If the switch is installed on a public LAN, the name should reflect the switch's Ethernet network DNS host name. For example, if the DNS host name is hpes224.hp.com, then enter **hpes224**.

   b. Enter a switch description of 255 or fewer alphanumeric characters in the Description field.

   c. Enter the switch physical location (255 or fewer alphanumeric characters) in the Location field.

   d. Enter the name of a contact person (255 or fewer alphanumeric characters) in the Contact field.

2. Click **Activate** to save the information. The message `Your changes to the identification configuration have been successfully activated` is displayed.

Configure date and time

Perform this procedure to configure the effective date and time for the switch. To set the date and time:

1. Select **Configure** > **Switch** > **Date/Time**. The Switch page is displayed with a highlighted red Date/Time tab selected (Figure 17).

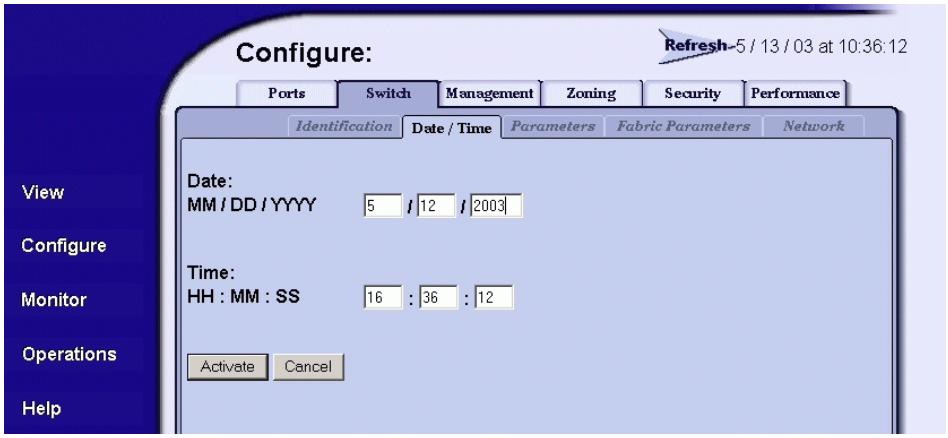


Figure 17 Switch page—Date/Time tab

   a. Click the Date fields that require change, and enter numbers in the following ranges:

      Month (MM): 1 through 12
      Day (DD): 1 through 31
      Year (YY): greater than 1980

   b. Click the Time fields that require change, and enter numbers in the following ranges:

      Hour (HH): 0 through 23
      Minute (MM): 0 through 59
      Second (SS): 0 through 59

2. Click **Activate** to save the information. The message `Your changes to the Date/Time configuration have been successfully activated` is displayed.

Configure switch and fabric parameters

Perform this procedure to configure the following switch and fabric operating parameters: Error Detect Time Out Value (E_D_TOV), Resource Allocation Time Out Value (R_A_TOV), preferred domain ID, and switch priority.

Configure switch parameters

The switch must be set offline to configure operating parameters. To configure the parameters:

1. Set the switch offline as follows:
   a. Select **Operations** > **Switch** > **Online State** to display the Online State tab.
   b. Click **Set Offline**. The message `Your changes have been successfully activated` is displayed.

2. Click **Configure** > **Switch** > **Parameters** to display the Parameters tab (Figure 18).

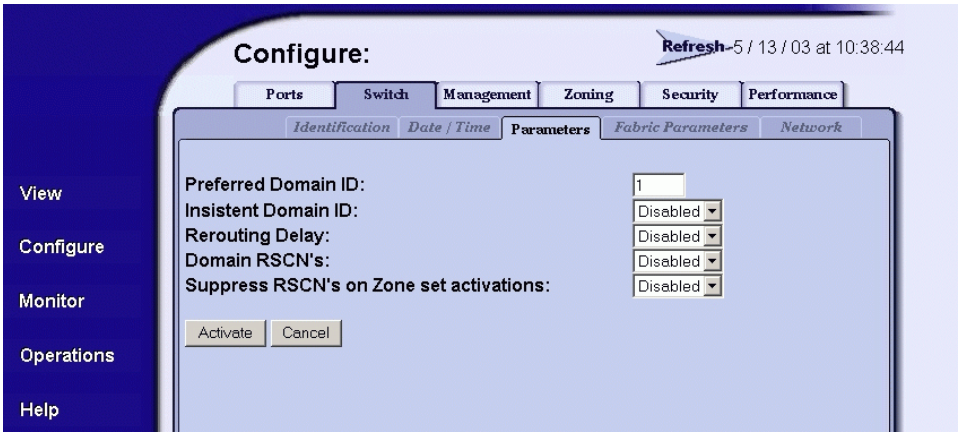


Figure 18 Switch page—Parameters tab

3. Set the switch parameters:
   a. Enter a value between 1 and 31 (the default is 1) in the Preferred Domain ID field. The domain ID uniquely identifies each switch in a fabric.

      All fabric-attached switches must have unique domain IDs. If the value is not unique, the E_Port connection to the switch segments and the switch cannot communicate with the fabric.

   b. Insistent Domain. This feature is not supported.

   c. Select **Enabled** or **Disabled** from the Rerouting Delay drop-down list. The default state is enabled.

      If rerouting delay is enabled, traffic is delayed through a fabric by the specified E_D_TOV time. This delay ensures Fibre Channel frames are delivered to their destination in order, even if a change to the fabric topology creates a new (shorter) transmission path.

   d. Select **Enabled** or **Disabled** from the Domain RSCNs drop-down list. The default state is disabled.

      Domain register for state change notifications (domain RSCNs) are sent between end devices in a fabric to provide additional connection information to host bus adapters (HBAs) and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port. Consult with your HBA and storage device vendor to determine if enabling Domain RSCNs will cause problems with your HBA or storage products.

   e. Select **Enabled** or **Disabled** from the Suppress RSCNs on Zone set activations drop-down list. The default state is disabled.

      When the parameter is enabled, attached devices do not receive notification following any change to the fabric's active zone set.

      When the parameter is disabled, attached devices (registered through the fabric format domain register) do receive notification following any change to the fabric's active zone set.

4. Click **Activate** to save the information. The message `Your changes to the Operating Parameters configuration have been successfully activated` is displayed.
5. Set the switch online:
   a. Select **Operations** > **Online State**. The Operations page is displayed with the Online State tab selected.
   b. Click **Set Online**. The message `Your changes have been successfully activated` is displayed.

Configure fabric parameters

The switch must be set offline to configure fabric parameters. To configure the parameters:

1. Set the switch offline as follows:
   a. Select **Operations** > **Online State** to display the Online State tab.
   b. Click **Set Offline**. The message `Your changes have been successfully activated` is displayed.
2. Click **Configure** to display the Ports page.
3. Select **Switch** > **Fabric Parameters**. The Switch page is displayed with the Fabric Parameters tab selected (Figure 19).

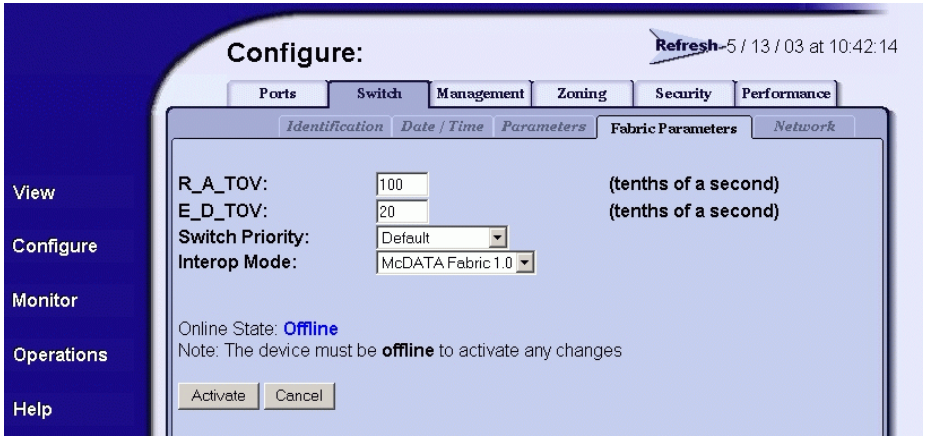


Figure 19 Switch page—Fabric Parameters tab

4. Set the fabric parameters:
   a. At the R_A_TOV field, enter a value between 10 and 1200 tenths of a second (1 through 120 seconds). The default is 10 seconds (100 tenths).

NOTE: All fabric-attached switches must be set to the same R_A_TOV. If the value is not compatible, the E_Port connection to the switch segments and the switch cannot communicate with the fabric. In addition, the R_A_TOV must be greater than the E_D_TOV.

b. At the E_D_TOV field, enter a value between 2 and 600 tenths of a second (0.2 through 60 seconds). The default is 20 tenths of a second (2 seconds).

NOTE: All fabric-attached switches must be set to the same E_D_TOV. If the value is not compatible, the E_Port connection to the switch segments and the switch cannot communicate with the fabric. In addition, the E_D_TOV must be less than the R_A_TOV.

c. Select **Principal**, **Never Principal**, or **Default** from the Switch Priority drop-down list. The default setting is **Default**.

This value designates the fabric's principal switch. The principal switch is assigned a priority of 1 and controls the allocation and distribution of domain IDs for all fabric elements (including itself).

Principal is the highest priority setting, Default is the next highest, and Never Principal is the lowest priority setting. The setting Never Principal means the switch is incapable of becoming a principal switch. If all switches are set to Principal or Default, the switch with the highest priority and the lowest World Wide Name (WWN) becomes the principal switch.

At least one switch in a fabric must be set as Principal or Default. If all switches are set to Never Principal, all interswitch links (ISLs) segment.

d. Select the interoperability mode from the Interop Mode drop-down list. Available options are:

- **McDATA Fabric 1.0**—Select this mode if the fabric contains only HP switches that are operating in Homogeneous Fabric mode.
- **Open Fabric 1.0** (default)—Select this mode if the fabric contains HP switches, as well as other open-fabric compliant switches. Select this mode for managing heterogeneous fabrics.

NOTE: When Open Fabric 1.0 is selected, the default zone is disabled, and you have to activate the default zone or enable the active zone set.

5. Click **Activate** to save the information. The message `Your changes to the Fabric Parameters configuration have been successfully activated` is displayed.
6. Set the switch online:
   a. Select **Operations** > **Online State**. The Operations page is displayed with the Online State tab selected.
   b. Click **Set Online**. The message `Your changes have been successfully activated` is displayed.

Configure network information

Verify the type of LAN installation with the network administrator. If one switch is installed on a dedicated LAN, network information (IP address, subnet mask, and gateway address) does not require change. See "Configure switch ports" on page 33.

If multiple switches are installed, or a public LAN segment is used, network information must be changed to conform to the LAN addressing scheme. Perform one of the following:

- If network information was changed while performing "Configure switch network information" on page 27, this procedure is not required. Go to "Configure SNMP trap message recipients" on page 43.
- If network information was not changed, perform the following steps to change a switch IP address, subnet mask, or gateway address:

1. Select **Configure** > **Switch** > **Network** to display the **Network** tab (Figure 20).

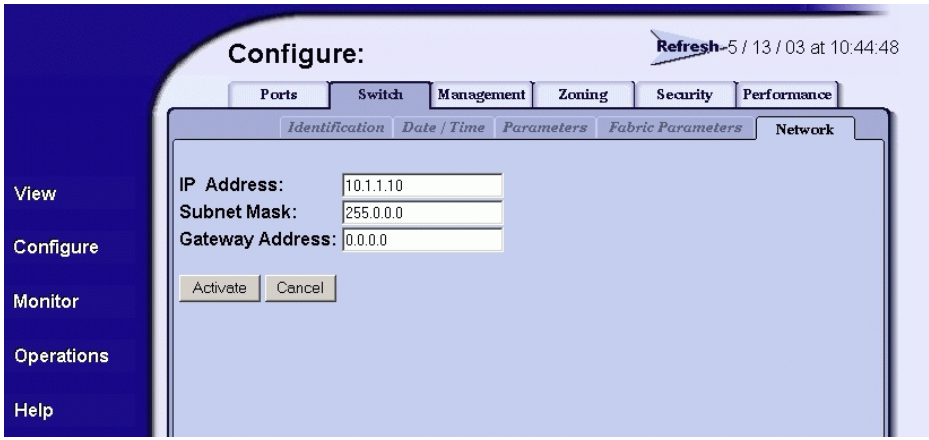


Figure 20 Switch page—Network tab

   a. At the IP Address field, enter the new value as specified by the network administrator (default (factory preset) is 10.1.1.10).
   b. At the Subnet Mask field, enter the new value as specified by the network administrator (default is 255.0.0.0).
   c. At the Gateway Address field, enter the new value as specified by the network administrator (default is 0.0.0.0).

2. Click **Activate** to save the information. The following message box is displayed (Figure 21).

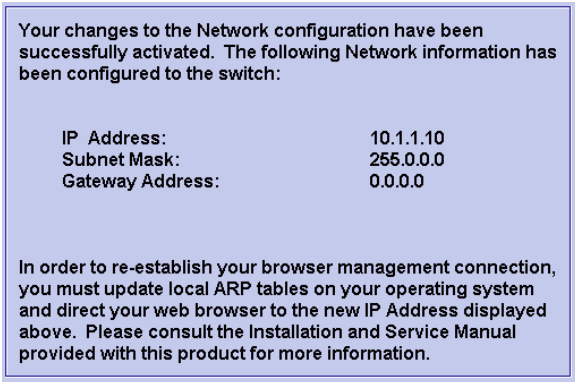


Figure 21 Network configuration changes activated

3. Update the address resolution protocol (ARP) table for the browser PC.
   a. Select **File** > **Close** to close the EWS and browser applications. The Windows desktop is displayed.
   b. Select **Start** > **Programs** > **Accessories** > **Command Prompt**. A disk operating system (DOS) window is displayed.
   c. Delete the switch's *old* IP address from the ARP table. At the command (`C:\`) prompt, enter `arp -d xxx.xxx.xxx.xxx`. The `xxx.xxx.xxx.xxx` is the old IP address for the switch.
   d. Click **close** (**X**) at the upper right corner of the DOS window to close the window or enter `exit` at the prompt to return to the Windows desktop.
4. At the PC, launch the browser application (Netscape Navigator or Internet Explorer).
5. At the browser, enter the switch's new IP address as the Internet URL. The Enter Network Password dialog box is displayed.
6. Enter the user name and password.

NOTE: The default user name is *Administrator* and the default password is *password*. The user name and password are case-sensitive.

7. Click **OK**. The EWS interface opens with the View window displayed.

Configure SNMP trap message recipients

Perform this procedure to configure community names, write authorizations, and network addresses for up to six SNMP trap message recipients. A trap recipient is a management workstation that receives notification (through SNMP) if a switch event occurs.

To configure SNMP trap recipients:

1. Select **Configure** > **Management** to display the SNMP tab (Figure 22).

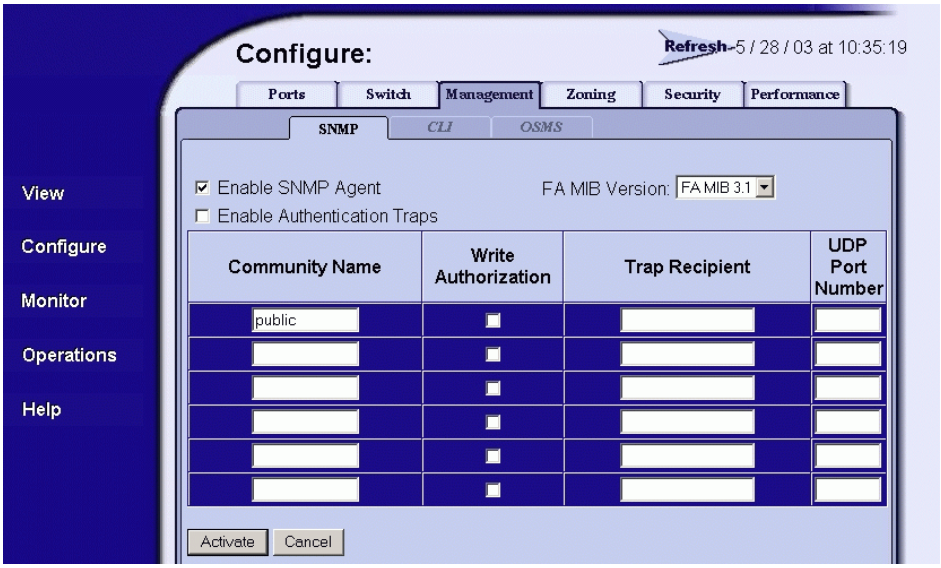


Figure 22 Management page—SNMP tab

a. Click the **Enable SNMP Agent** check box to enable or disable the installed SNMP agent.

b. Select the Fibre Alliance management information base (FA MIB) from the FA MIB Version drop-down list. This should be set to match the level of FA MIB used by the SNMP management stations that access the product. Available selections are:

- **FA MIB Version 3.0**
- **FA MIB Version 3.1**

c. Click the **Enable Authentication Traps** check box to enable or disable transmission of SNMP trap messages to configured recipients.

d. For each trap recipient to be configured, type a community name of 32 alphanumeric characters or less in the associated Community Name field. The community name is incorporated in SNMP trap messages to ensure against unauthorized viewing or use.

e. Click the check box in the **Write Authorization** column to enable or disable write authorization for the trap recipient (default is disabled).

A check mark in the box indicates write authorization is enabled. When the feature is enabled, a management workstation user can change `sysContact`, `sysName`, and `sysLocation` SNMP variables, which correspond respectively to the Contact, Name, and Location information described in "Configure switch identification" on page 36.

f. Type the IP address or DNS host name of the trap recipient (SNMP management workstation) in the associated Trap Recipient field. Use four-byte, dotted-decimal format with a maximum of 16 characters. HP recommends using the IP address.

g. The default user datagram protocol (UDP) port number for trap recipients is 162. Type a decimal port number in the associated UDP Port Number field to override the default. The UDP port number value ranges from 1 to 65535.

2. Click **Activate** to save the information. The message `Your changes to the SNMP configuration have been successfully activated` is displayed.

Enable or disable the CLI

Perform this procedure to toggle (enable or disable) the state of the switch's command line interface and to configure the secure shell, which provides secure access and encrypted data for the Telnet function:

1. Select **Configure** > **Management** > **CLI** to display the CLI tab (Figure 23).

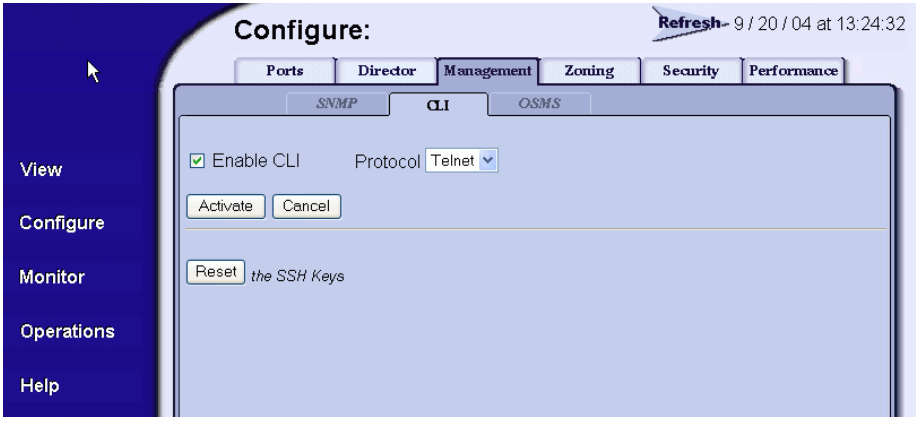


Figure 23 Management page—CLI tab

2. Click the **Enable CLI** check box to select it.
3. To enable secure shell (SSH), select **SSH** from the Protocol drop-down list.

NOTE: The default value is Telnet which means that data is not encrypted between the user and the product. By selecting SSH, data, such as a user ID and password, is encrypted between the user and the product.

4. Click **Activate**. The message `Your changes to the CLI configuration have been successfully activated` is displayed.

Enable or disable OSMS and host control

Perform this procedure to toggle (enable or disable) host control of the switch through the Open System Management Server (OSMS). The OSMS) is a keyed feature that allows host control and inband management of a director or a switch through a management application that resides on an open-systems interconnection (OSI) device. This device is attached to a director or switch port. The device communicates with the switch or director through Fibre Channel common transport (FC-CT) protocol.

The OSMS feature must be installed to access this control. Refer to "Configure feature keys (optional)" on page 48 for instructions. If the feature is not installed, the message `This Feature Not Installed` appears.

To enable or disable host control:

1. Select **Configure** > **Management** > **OSMS**. The Management page displays with the OSMS tab selected (Figure 24).

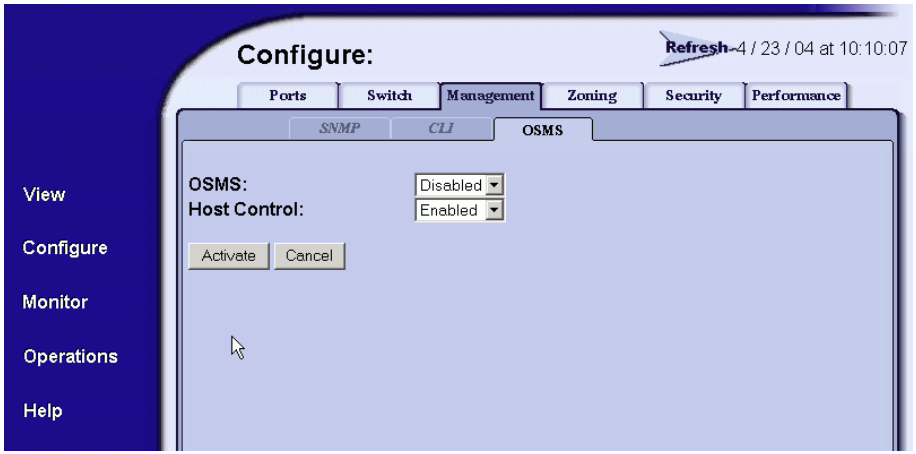


Figure 24 Management page—OSMS tab

2. From the OSMS drop-down list, select either **Enabled** to activate the OSMS or **Disabled** to deactivate the OSMS.
3. To change the host control state, select **Enabled** or **Disabled** from the Host Control drop-down list.

NOTE: Before you can enable host control state, OSMS must be enabled.

Configure user rights

Perform this procedure to change the administrator-level and operator-level passwords used to access the EWS interface through the Enter Network Password dialog box.

NOTE: If you want to create a user account, review the *Embedded Web Server User Guide* for more information.

Before you create a new user, you should review the information on security features.

To change user passwords:

1. Select **Configure** > **Security** to display the Authorize Users (Auth Users) tab (Figure 25).

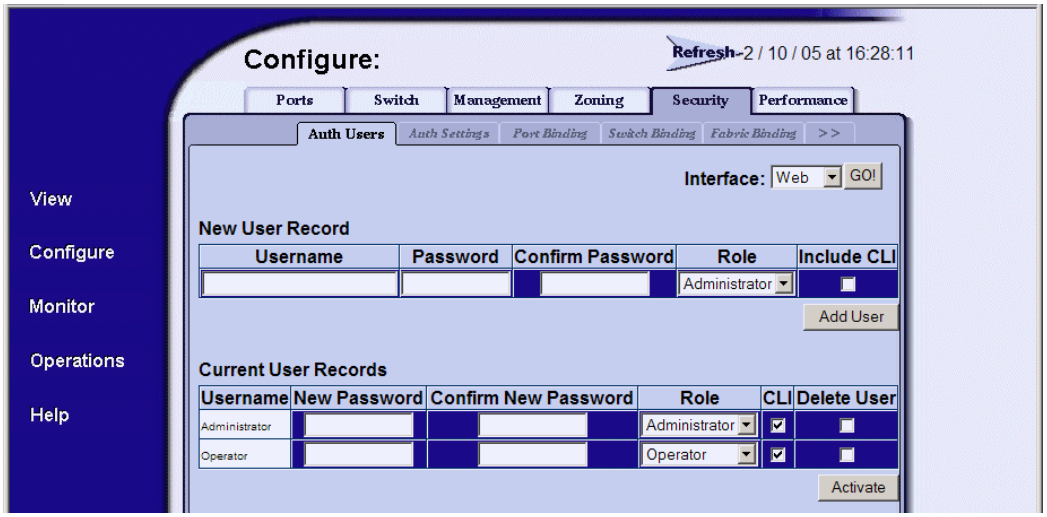


Figure 25 Security page—Auth Users tab

2. Under Current User Records, enter the new password in the New Password column. Use 16 or fewer alphanumeric characters.
3. Enter the new password in the Confirm New Password column.
4. Select the appropriate role for the user from the Role drop-down list: **Administrator**, **Operator**, or **No Role**.
5. Click the **CLI** box to enable the user to use the same password for accessing the CLI.
6. Click **Activate** to activate and save the information. The message `Your changes to the Auth Users configuration have been successfully activated. Login may be required.` is displayed.

Configure port binding

Perform this procedure to configure Fibre Channel port binding by WWN.

To configure port binding:

1. Select **Configure** > **Security** > **Port Binding** to display the Port Binding tab (Figure 26).

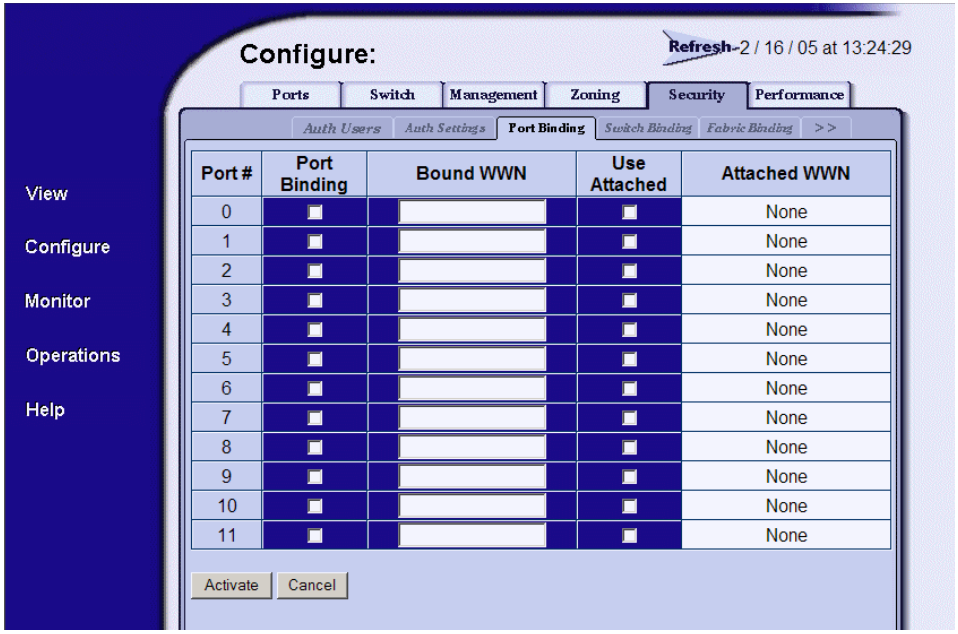


Figure 26 Security page—Port Binding tab

   a. Click the check box in the **Port Binding** column to enable or disable port binding for a specified port (default is disabled).
   b. In the **Bound WWN** column, enter the WWN of the device to which the port is to be bound. If port binding is enabled, only the specified device can connect to the port. If port binding is enabled and no device is specified in the **Bound WWN** column, then no devices can connect to the port.
   c. The Attached WWN column contains read-only fields that list the WWNs of attached Fibre Channel devices. Click the check box in the **Use Attached** column to indicate the WWN specified in the Attached WWN column is to be used for port binding. After activation, the attached WWN is displayed in the Bound WWN column.

2. Click **Activate** to save the information. The message `Your changes to the port binding configuration have been successfully activated` is displayed.

Configure switch binding

This feature is managed through the Switch Binding submenu options available on the Element Manager Configure menu. Using Switch Binding, you can specify devices and switches that can attach to director and switch ports. This provides security in environments that include a large number of devices by ensuring that only the intended set of devices attach to a switch or director. For complete procedures on configuring this optional feature, refer to the *HP StorageWorks Edge Switch Element Manager user guide*.

Configure feature keys (optional)

For complete procedures on configuring this feature, refer to *HP StorageWorks Edge Switch Element Manager user guide*.

Connect cables to fibre channel ports

Perform this task to connect devices to the switch:

1. Set the switch offline as follows:
   a. Select **Operations** > **Switch** > **Online State** to display the Online State tab.
   b. Click **Set Offline**. The message `Your changes have been successfully activated` is displayed.
2. Route single-mode or multi-mode fiber-optic cables (depending on the type of SFP pluggable optic transceivers installed) from customer-specified devices to ports at the front of the switch.
3. Connect device cables to small form factor pluggable (SFP) transceivers.
4. Set the switch online as follows:
   a. Select **Operations** > **Online State**. The Operations page is displayed with the Online State tab selected.
   b. Click **Set Online**. The message `Your changes have been successfully activated` is displayed.

Configure zoning

The default zone on the Edge Switch 2/12 is disabled by default. Zoning must be configured in order for any devices connected to the edge switch to communicate. Perform this procedure to:

- Configure, change, add, or delete zones. A zone is a group of devices that can access each other through port-to-port connections. Devices in the same zone can recognize and communicate with each other; devices in different zones cannot.
- Configure, change, enable, or disable zone sets. A zone set is a group of zones that is activated or deactivated as a single entity across all managed products in either a single-switch or a multi-switch fabric. Only one zone set can be active at one time.

Configure zones

To configure zones at the EWS interface:

1. At the Configure panel, select **Zoning** > **Zones** to display the Zones tab (Figure 27).

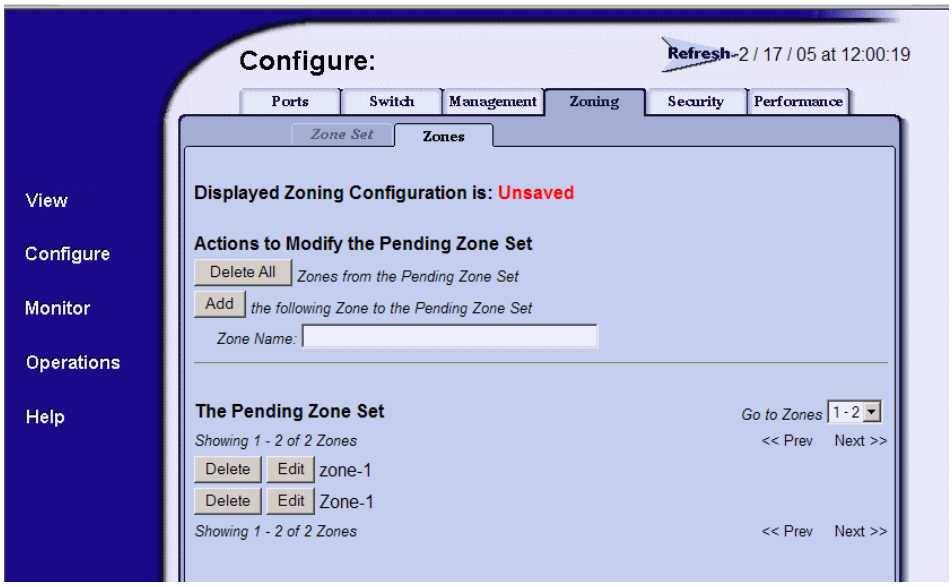


Figure 27 Zoning page—Zones tab

2. To configure a zone, first add the zone name to the zoning library. The following naming conventions apply to zones and zone sets:
   - All names must be unique and may not differ by case only. For example, zone-1 and Zone-1 are both valid individually, but are not considered unique.
   - The first character of a zone set name must be a letter (A through Z or a through z).
   - A zone set name can have a maximum of 64 characters and cannot contain spaces.
   - Valid characters are alphanumerical and the caret (^), hyphen (-), underscore (_), or dollar ($) symbols.
3. Enter the zone name in the Zone Name field and click **Add**. Note the following:
   - Save and activate the zone—Changes to a zone or zoning configuration are not saved and activated on the switch until saved as part of a zone set. Go to "Modify zone sets" on page 51 to find out how to perform this function.
   - Delete all zones—To delete all configured zones and zone members, click **Delete All**. A confirmation dialog box is displayed. Click **OK** to delete all zones.
   - Delete a single zone—To delete a single zone and its zone members, click **Delete** next to the zone name. A confirmation dialog box is displayed. Click **OK** to delete the zone.
   - Display more zones—If a zone set contains more than 64 zones, the Display More Zones link activates to display subsequent pages. In addition, the Display Previous Zones link activates on subsequent displayed pages.

4. To add devices (members) to the zone, click the **Edit** next to the zone name (**zone-1**). The Zoning page is displayed with the Modify Zone tab selected (Figure 28).

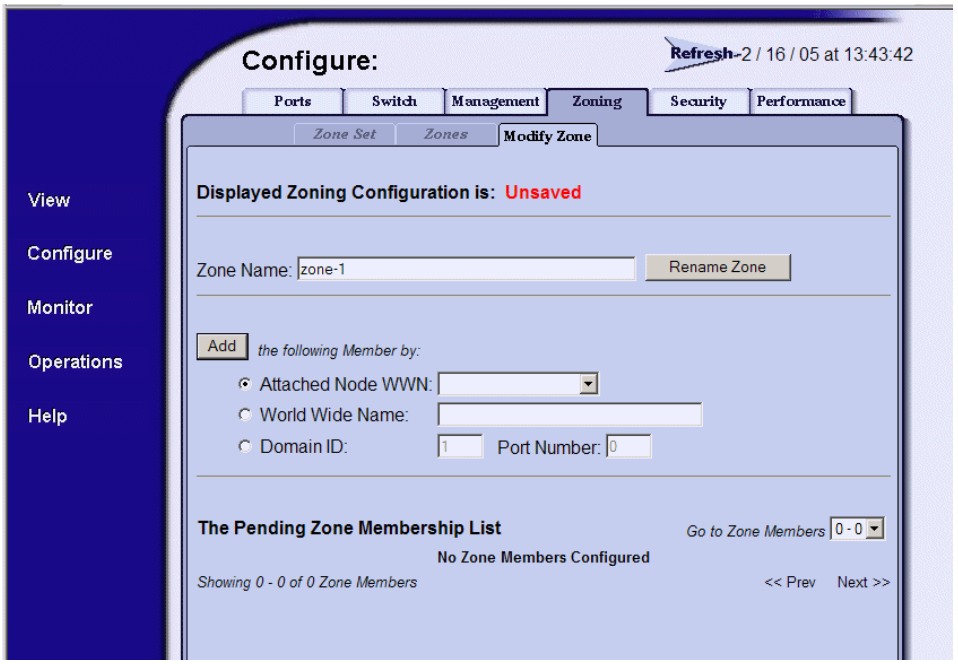


Figure 28 Zoning page—Modify Zone tab

5. Enter the new name in the Zone Name field and click **Rename Zone**. After the name is validated, the zone name is changed.
6. Add or delete zone members as follows:
   - Add member by attached node WWN—Select the WWN of an attached device (node) from the Attached Node World Wide Name drop-down list and click **Add**. The device is added to the zone.
   - Add member by WWN—Enter the WWN of an attached device in the World Wide Name field and click **Add**. The device is added to the zone.
   - Add member by domain ID and port number—Enter the domain ID (1 through 31) of the switch in the Domain ID field, enter the switch port number (0 through 11) to which a device is attached, and click **Add**. The device attached to that port is added to the zone.
   - Delete a member—To delete a zone member, click **Delete** next to the configured zone member (WWN or domain ID and port number) at the bottom of the page. A confirmation dialog box is displayed. Click **OK** to delete the zone member.

NOTE: Zoning by domain ID and port number is not available when the switch is in Open Fabric 1.0 Interop Mode.

7. Changes to a zone, zoning configuration, or zone member are not saved and activated on the switch until saved as part of a zone set. Go to "Modify zone sets" on page 51 to perform this function.

Modify zone sets

To modify active zone sets:

1. Click **Configure** > **Zoning** > **Zone Set** to display the Zone Set tab. (Figure 29).

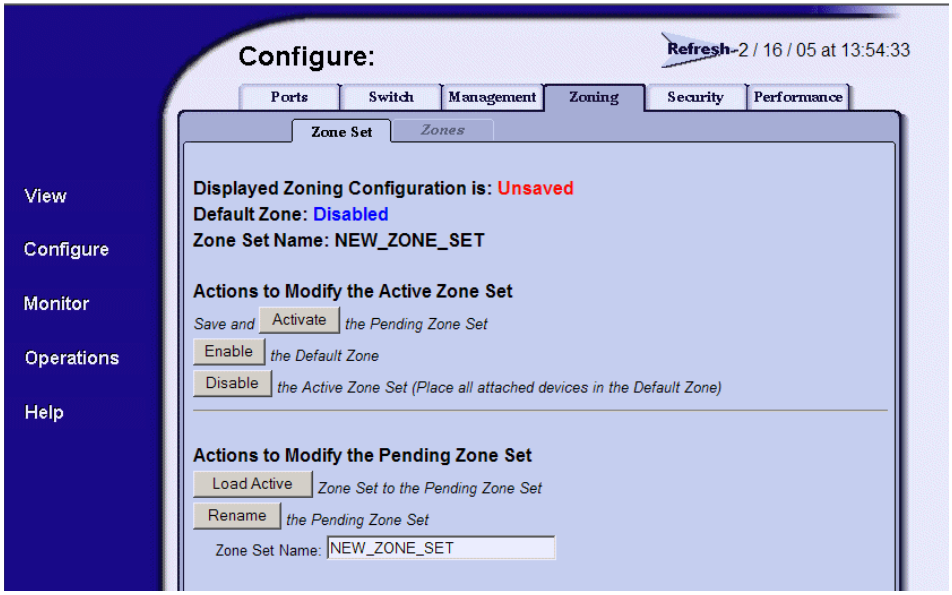


Figure 29 Zoning page—Zone Set tab.

2. Click Save and **Activate** the Pending Zone Set to propagate the active zone set throughout the fabric. A message displays indicating whether your changes were successfully saved to the switches in the fabric or if there was a configuration problem preventing the zone set from being activated. In order to activate a zone set you must configure one or more zones as part of the zone set.

> **NOTE:** Changes made to the active zone set within the Embedded Web Server zoning interface are not visible on the fabric until you click **Activate**.

3. To disable or enable the default zone state, click **Enable** the Default Zone or **Disable** the Default Zone, respectively.

> **NOTE:** Unlike other changes made through the Embedded Web Server zoning interface, enabling or disabling the default zone does not require clicking the Save and **Activate** the Pending Zone Set Configuration button to propagate the changes throughout the fabric.

4. To place all devices in the default zone, click **Disable** the Active Zone Set. Placing all devices in the default zone allows all devices in the fabric to communicate with each other.

To modify a pending zone set:

1. Enter a new name in the Zone Set Name field and click **Rename** the Pending Zone Set to rename the current zone set.
2. To discard any changes made to the pending Zone Set Configuration and load the Active Zone Set Configuration, click **Load Active**. You will be asked to confirm your request. The Active Zone Set configuration is displayed when the page is refreshed.

Connect the Edge Switch to a fabric

To connect the Edge Switch 2/12 to another switch in a fabric, you must have an E-port license installed in the switch to enable this feature.

To provide Fibre Channel connectivity between public devices and fabric- attached devices, connect the switch to an expansion port (E_Port) of an HP Director or Edge Switch. The switch port-to-switch port connection is called an interswitch link (ISL). To fabric-attach the Edge Switch and create an ISL:

1. Ensure the Edge Switch is accessible by the EWS interface (defined while performing "Accessing the Embedded Web Server" on page 31.
2. Ensure the preferred domain ID for the Edge Switch is unique and does not conflict with the ID of another Edge Switch participating in the fabric. To change the domain ID, see "Configure switch and fabric parameters" on page 37.
3. Ensure the R_A_TOV and E_D_TOV values for the Edge Switch are identical to the values for all Edge Switches participating in the fabric. To change the values, see "Configure switch and fabric parameters" on page 37.
4. Route a multi-mode or single-mode fiber-optic cable (depending on the type of SFP transceiver installed) from a customer-specified E_Port of the switch to the switch.
5. Connect the switch-attached fiber-optic cable to the port SFP transceiver.
6. Click **View** to display the Switch tab.
7. Click **Port Properties** to display the Port Properties page, with **0** selected, and port information listed for port 0.
8. Select the port number of the port used to make this ISL connection.
9. Ensure the Operational State field displays **Online** and the Reason field displays **N/A** or is blank. If an ISL segmentation or other problem is indicated, refer to the *HP StorageWorks Edge Switch 2/12 service manual* to isolate the problem. If no problems are indicated, installation tasks are complete.

Managing firmware versions

The Edge Switch 2/12 internal operating code is downloaded using the EWS interface. For complete information on managing firmware, see the *HP StorageWorks Edge Switch 2/12 service manual*.

A Regulatory compliance and safety

This appendix covers the following topics:

Regulatory compliance

Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (i.e., personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, visit http://www.hp.com.

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P.O. Box 692000, Mailstop 510101
  Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, Regulatory Model Number, or product number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique Regulatory Model Number. The RMN can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this RMN. The Regulatory Model Number should not be confused with the marketing name or model number of the product.

Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

Laser safety warning

⚠ **WARNING!** To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP authorized service technicians to repair the laser device.

Certification and classification information

This product contains a laser internal to the fiber optic (FO) transceiver for connection to the Fibre Channel communications port.

In the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. A label on the plastic FO transceiver housing indicates the certification.

Outside the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in IEC 825-1:1993 and EN 60825-1:1994, including Amendment 11:1996 and Amendment 2:2001.

Laser product label

The optional label in Figure 30 or equivalent may be located on the surface of the HP supplied laser device.

This optional label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label may appear on the laser device installed in your product.

Figure 30 Class 1 laser product label

International notices and statements

Canadian notice (avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union notice

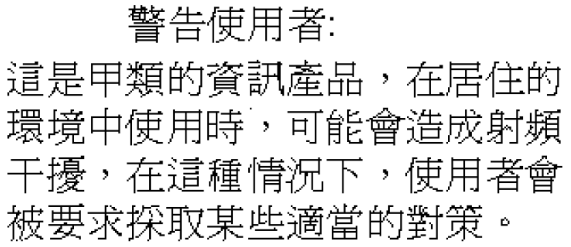
Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, IEC61000-4-3, IEC61000-4- 4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11) - Electromagnetic Immunity
- Power Quality:
  - EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
  - EN61000-3-3 (IEC61000-3-3) - Power Line Flicker

- EN60950 (IEC60950) - Product Safety
- Also approved under UL 60950/CSA C22.2 No. 60950-00, Safety of Information Technology Equipment.

BSMI notice



Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korean notices

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니
판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
바랍니다.

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

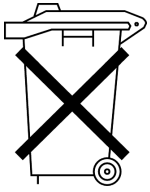
Safety

Battery replacement notice

Your computer is equipped with a lithium manganese dioxide, a vanadium pentoxide, or an alkaline internal battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Replacement is to be done by an HP authorized service provider using the HP spare part designated for this product. For more information about battery replacement or proper disposal, contact an HP authorized reseller or HP authorized service provider.

⚠ **WARNING!** Your computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the HP spare part designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an HP authorized reseller or service provider.

Taiwan battery recycling notice

廢電池請回收

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Power cords

The power cord set must meet the requirements for use in the country where the product was purchased. If the product is to be used in another country, purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm^2 or 18 AWG, and the length of the cord must be between 1.8 m (6 ft) and 3.6 m (12 ft). If you have questions about the type of power cord to use, contact an HP authorized service provider.

NOTE: Route power cords so that they will not be walked on and cannot be pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

Japanese power cord notice

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Electrostatic discharge

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing electrostatic damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly (see "Grounding methods" on page 60).

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm (±10 percent) resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your HP authorized reseller.

B Technical specifications

This appendix contains the following information:

Factory defaults

Table 3 lists the defaults for the user name; passwords; and IP, subnet mask, and gateway addresses.

Table 3 Factory-set defaults

Item	Default
EWS interface username (case-sensitive)	Administrator
EWS interface password (case-sensitive)	password
Customer password	password
Maintenance password	level-2
IP address	10.1.1.10
Subnet mask	255.0.0.0
Gateway address	0.0.0.0

Table 4 provides the Edge Switch factory-default values for the Reset Configuration option.

Table 4 Switch factory-default values for reset configuration option

Configuration	Description	Default
Identification	Switch Name	NULL string
	Switch Description	“Fibre Channel Switch”
	Switch Contact	“End User Contact (please configure)”
	Switch Location	“End User Contact (please configure)”

Table 4 Switch factory-default values for reset configuration option (continued)

Configuration	Description	Default
Ports	Port Names	NULL strings
	Port Blocked States	Unblocked
	FAN	Enabled
	Ports enabled	4
Switch Addressing	IP Address	10.1.1.10
	Subnet Mask	255.0.0.0
	Gateway Address	0.0.0.0
	MAC Address	PROM value
Operating Mode	Must select one of two modes: Homogeneous mode or Open Fabric 1.0. The recommended mode is Open Fabric 1.0.	Open Fabric 1.0 mode
Operating Parameters	Preferred Domain ID	1
	Insistent Domain ID	Disabled
	Rerouting Delay	Enabled
	Domain RSCN's	Disabled
	Suppress RSCN's on Zone set activations	Disabled
	R_A_TOV	10 seconds (100 tenths)
	E_D_TOV	2 seconds (20 tenths)
	Switch Priority	Default
SNMP	SNMP Communities	"public" — 5 NULL strings
	SNMP Write Authorizations	Read only per community
	Trap Recipient IP Addressees	0 for each
	UDP Port	162
	SNMP Authorization Trap State	disabled

Table 4 Switch factory-default values for reset configuration option (continued)

Configuration	Description	Default
Zoning	Number of Zone Members	0
	Number of Zones	0
	Number of Zone Sets	0
	Zone Names	None
	Zone Sets Names	None
	Zone Members	None
	Default Zone State	Disabled
	Active Zone Set State	Disabled
	Active Zone Set Name	NULL string

Physical dimensions

Table 5 lists Edge Switch 2/12 dimensions.

Table 5 Dimensions

Dimension	Size
Height	4.4 cm (1.8 in)
Width	43.2 cm (17 in)
Depth	44.5 cm (17.5 in)
Weight	6.8 kg (15 lb)
Shipping Weight	9.5 kg (21 lb)

Environmental specifications

Table 6 lists environmental ranges for shipping, storing, and operating the HP StorageWorks Edge Switch 2/12.

Table 6 Environmental specifications

Specification	Shipping	Storage	Operating
Weight	9.5 kg (21 lb)	7.7 kg (17 lb)	7.7 kg (17 lb)
Temperature	-40° F to 140° F (-40° C to 60° C)	34° F to 140° F (1° C to 60° C)	40°F to 104°F (4°C to 40 °C)
Humidity	5% to 100%	5% to 80%	8% to 80%

Table 6 Environmental specifications (continued)

Specification	Shipping	Storage	Operating
Maximum wet-bulb temperature	84° F (29° C)	84°F (29°C)	81°F (27°C)
Altitude	40,000 ft (12,192 m)	40,000 ft (12,192 m)	10,000 ft (3,048 m)

Power requirements

Table 7 lists Edge Switch 2/12 power requirements.

Table 7 Power requirements

Specification	Value
Input voltage	100 to 240 VAC
Input frequency	47 to 63 Hz

Operating tolerances

Table 8 lists heating and cooling specifications, shock tolerances, vibration, acoustical noise, and inclination.

Table 8 Operating tolerances

Specification	Value
Heat dissipation	49 watts (167 BTU/hr)
Cooling airflow clearances	Right and left sides: 1.3 cm (0.5 inches) Front and rear: 7.6 cm (3.0 in) Top and bottom: No clearance required
Shock and vibration tolerance	60 Gs for 10 milliseconds without nonrecoverable errors
Acoustical noise	70 dB “A” scale
Inclination	10° maximum

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